Executive Summary

Overview

On June 27, 2000, a passenger vehicle and semitractor-trailer collided on Washington State Route (SR) 24 near the U.S. Department of Energy's (DOE) Hanford Site. The vehicle fire resulting from the fatality accident quickly ignited vegetatio on both sides of the highway. An abundance of natural fuel and adverse weather conditions allowed the fire to move rapidly across the Fitzner-Eberhardt Arid Lands Ecology (ALE) Reserve, a 120-square-mile area southwest of the central Hanford Site and part of the Hanford Reach National Monument. By the afternoon of June 28, the fire jumped SR 240, threatening facilities on the central Hanford Site. From June 27 through July 1, the 24 Command Wildland Fire burned nearly 300 square miles of both public and private lands. The fire consumed an average of 2,000 acres per hour. In addition, during one 90-minute period, the fire traveled 20 miles.

Accident scene

On June 30, the manager of the DOE Richland Operations Office (RL) established a Type B accident investigation board (Board) to address the responses of DOE and its Hanford Site contractors to the fire. This report documents the Board's investigation. The report focuses on the emergency response of Hanford personnel's actions taken on lands within their jurisdiction or in response to mutual aid agreements. It also applies lessons learned from previous fires at the Hanford Site, with the goal of providing information for use in improving DOE response to fire incidents across the agency's national complex.

The Fire

The June 27 motor vehicle accident occurred at Milepost 36 on SR 24, approximately two miles west of the Yakima Barricade on the northwest corner of the Hanford Site. The semitractor-trailer involved in the accident jackknifed as a result of the collision and fully blocked both the eastbound and westbound lanes of traffic. Before the semi came to a complete stop, the fuel from the vehicle's tanks ignited and started fires on both sides of SR 24.

The area where the fires began is managed as the ALE Reserve by the U.S. Fish and Wildlife Service (FWS) under permit from DOE. The vegetation surrounding the accident site is typical of that on the Hanford Site—cheat grass, tumbleweed, and sagebrush representative of an arid shrub-steppe habitat. Hot, dry weather had accelerated the fire season in the area. The National Weather Service had posted a Red Flag warning, alerting forecast users to an ongoing or imminent critical fire weather pattern.

Hanford Fire Department grass rig fights fire on Arid Lands Ecology Reserve

Initial Response

Within minutes of the accident, the Hanford Fire Department (HFD) and Hanford Patrol received notification of the event from the dispatcher for the Washington State Patrol as well as from private citizens. At 1:39 p.m., personnel from the Hanford Patrol and HFD Medic 92 Unit were the first emergency responders to arrive on the scene. At the scene, the emergency responders found a semitractor-trailer fully engulfed in flame and two separate wildland fires estimated at five acres and rapidly growing. Considerable traffic had backed up in both the eastbound and westbound lanes of the narrow roadway, complicating the scene.

Upon receiving the initial notification, the HFD engine company captain recognized the severity of the fire based on both knowledge of the terrain and on the Red Flag warning for the day. He initially dispatched two additional fire suppression units in addition to the standard response units (engine, pumper/tanker, and two ambulances). While en route to the scene, he notified the Benton County Southeast Communications Center (SE-COMM) and requested additional HFD firefighting support, which included heavy equipment.

The HFD captain arrived on the scene at 1:44 p.m. and established an incident command. The fire was estimated to have increased to ~10 acres in size on both sides of SR 24 and was spreading at about 6 to 8 miles per hour with high winds and some upward flame heights of approximately 30 feet. Vehicles continued to enter and congest SR 24 on both sides of the accident, and the captain requested Hanford Patrol to close the highway. At approximately 1:45 p.m., HFD personnel cut the fencelines to permit pumper/tankers immediate access to the ALE Reserve.

Arriving grass units and pumper/tankers were assigned to fight the fire on both the north and south sides of SR 24. The primary objective on the north side was to protect nearby private structures and property. The units on the south side were tasked with extinguishing the flanks of the fire while working their way to the head of the fire, in addition to providing support to protect the traffic stopped on the roadway.

Incident Command

The HFD battalion chief arrived on scene and assumed command at 1:52 p.m. The HFD captain already had notified the FWS of the event and had requested FWS fire units. The battalion chief also requested additional heavy equipment to be staged at the Hanford Yakima Barricade approximately two miles from the fire location. The U.S. Army Yakima Training Center was contacted and initially agreed to provide helicopter fire suppression support.

HFD pumper/tanker attacks fire

At approximately 2:30 p.m., a HFD grass rig was approximately two miles south of SR 24, scouting ahead of pumper/tankers to locate a passable route, when its engine quit. The crew members were forced to abandon their vehicle, which was totally destroyed, and escaped through the oncoming fireline and into the burned area. The crew members were not injured and walked back to SR 24, where they were picked up by one of the pumper/tankers.

Also during this period, a private citizen volunteered his services and heavy equipment to create firebreaks. His service was declined for safety reasons.

By 3:00 p.m., all HFD wildland assets had been dispatched, and aerial assets were requested from the Central Washington Interagency Communications Center (CWICC). The fire, estimated then at approximately 500 acres, was rapidly outrunning crews on the south side of SR 24.

During the afternoon and evening, the fire continued to expand to the north, south, and west. Arriving units were assigned to fight on multiple fronts. Based upon his assessment, the Incident Commander (HFD chief) requested two strike teams of wildland apparatus under the Tri-County Mutual Aid Agreement. He also requested additional heavy equipment (caterpillars and road graders). Two air tankers accompanied by a lead aircraft began retardant drops at 4:00 p.m. and continued until dark.

Throughout the evening, resources and equipment were deployed as they arrived.

At approximately 11:36 p.m. on June 27, the HFD relinquished Incident Command to a Type 3 Incident Management Team (IMT) but remained in support at the Incident Command Post (ICP). This turnover was the last point at which Hanford personnel exercised command authority for the overall fire. From that time, the HFD participated as a responder under the National Wildfire Coordinating Group incident command structure (Type 1, 2, and 3 IMT). All HFD equipment remained fully deployed in support of the fire on the ALE Reserve and adjacent private lands on Rattlesnake Mountain.

By the morning of June 28, the fire size was estimated at 23,630 acres. The fire grew to an estimated 31,190 acres by noon and breached the last best line of defense on the ALE Reserve at Snively Canyon.

Weather conditions had deteriorated, and both wind strength and direction were affecting the Hanford Site unfavorably. Because the fire was threatening to cross SR 240 onto the central Hanford Site (200 Area), the HFD Incident Commander redeployed HFD firefighting assets to defend property and structures on the site. By 3:47 p.m., the fire had jumped SR 240 and was moving eastward toward the 200 West Area.

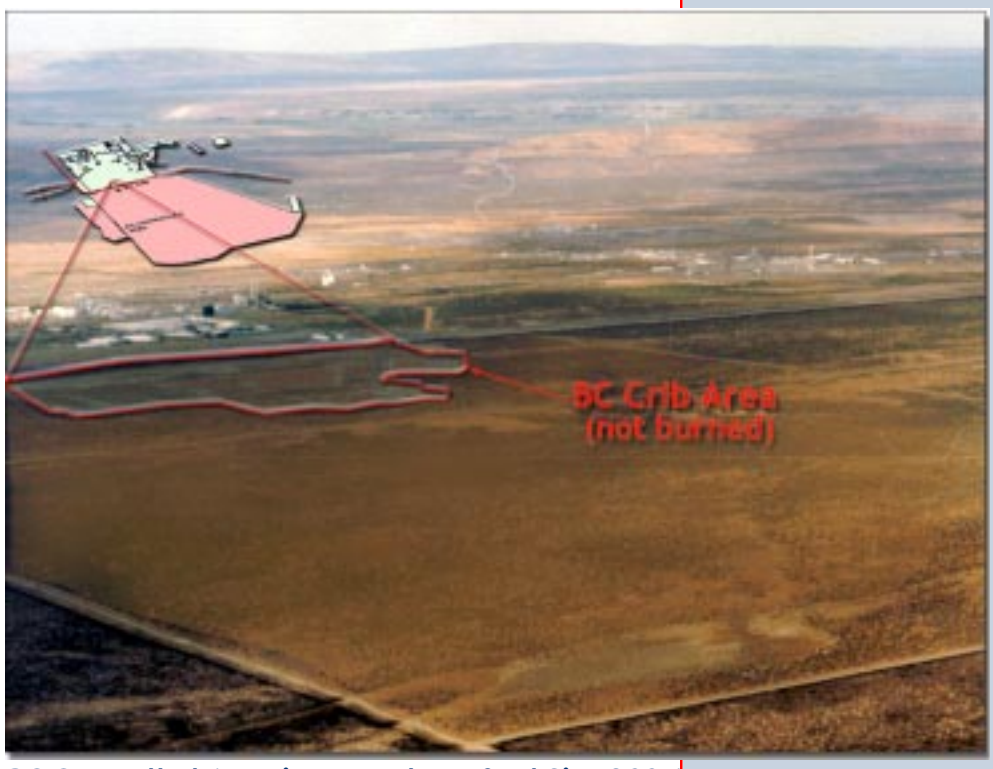
The fire's approach to the 200 Area prompted RL to declare an Alert level emergency for the Hanford Site at 4:28 p.m., and the Hanford Emergency Operations Center (EOC) in the downtown Richland Federal Building was activated.

DOE-HQ, in consultation with RL and the White House, requested that the U.S. Environmental Protection Agency (EPA) provide radiological monitoring of the event. In addition, RL requested that the Aerial Measuring System (AMS) aircraft maintained by the DOE Nevada Operations Office be deployed to the Hanford Site.

Fighting the 24 Command fire by air

The fire's continued growth (estimated to have consumed approximately 88,640 acres by 6:00 p.m.) and the level of resources being used to fight it required escalating the Type 3 IMT to a Type 2 IMT at approximately 6:00 p.m. on June 28. (A Type 2 IMT provides state level support capabilities.) The fire's progression to the south also prompted Benton County to declare a state of emergency at 6:00 p.m. On the Hanford Site, the spreading fire threatened the Laser Interferometer Gravitational-Wave Observatory (LIGO), a non-DOE facility. The LIGO was evacuated safely.

At approximately 8:00 p.m., the fire jumped SR 225 near the Wanawish Dam at Horn Rapids on the Yakima River and was approaching industrial facilities, recreational, and residential properties on the Hanford boundaries. The fire also was approaching the HAMMER and Hanford Patrol facilities on the site. Soon after 8:00 p.m., the fire jumped the Yakima River and briefly threatened lands just north of the city of West Richland. At approximately 9:00 p.m., the fire entered the Benton City area.



BC Controlled Area in central Hanford Site 200 Area

On June 29 at 1:45 a.m., the Governor of the State of Washington declared a state of emergency. The fire had been stopped successfully around the 200 West facilities but was continuing to move east and south across the central Hanford Site. During the remainder of June 29, fire crews continued to battle the blaze. Defensive lines were cut along major thoroughfares on the site, and crews kept the fire from reaching the 400 and 300 Area facilities. Reduced wind speeds significantly improved weather conditions, which contributed to fire containment. Aerial support was used to combat the fire that burned a portion of the BC Controlled Area but not the BC Crib Area.

Closure

On June 30, RL and the Hanford Site contractor organizations established a recovery team. A post-event radiological survey team was dispatched to assess unused laboratory facilities that had been overrun by fire on the ALE Reserve's southeast flank of Rattlesnake Mountain. The main facilities were found to be intact, but the fire had destroyed a nearby trailer and metal storage shed. Neither structure housed any radioactive or hazardous materials. These were the only structural losses suffered on the Hanford Site.

The EOC Alert emergency was terminated at 4:57 p.m. on June 30. On July 1 at 4:00 p.m., the fire was officially declared to be contained and out. Firefighters had patrolled the site, extinguishing remaining hotspots and looking for flare-ups during the day.

Conclusions

The Board concluded that the HFD's response to the initial event was proactive and timely. The fire was an immediate and spontaneous result of the vehicle accident. However, the lack of maintenance of defensible firebreaks along state highways running through the Hanford Site allowed the fire to spread quickly onto the ALE Reserve. The HFD leadership recognized the severity of the fire and marshaled all available resources at the disposal of the local command. Within the first hour of the event, all available HFD wildland resources were deployed. In addition, air tanker support and FWS firefighting resources were requested at a very early stage. The decisions to escalate the fire response from local command through mutual aid and to a Type 3 IMT structure were made within hours of the initial notification and were influenced appropriately by the characteristics of the fire and the unique terrain involved.

The Board also viewed the emergency response of other Site personnel as proactive. The early release of nonessential staff from Hanford was preventive, diminishing overall health effects to workers, allowing for an orderly withdrawal in front of the fire, and providing less encumbered access to emergency responders.

Sound preventive fire planning and execution, including fire-safe designs and enforcement of vegetation control and fire setbacks around facilities, contributed to the successful defense of Hanford structures and infrastructure. Vegetation management on waste sites and controlled areas contributed positively to minimizing the release of airborne radioactivity during the fire. Only very minor vegetation damage occurred on the waste sites and controlled areas. The Board concluded that the combination of sound preventive techniques and effective event management accounted for the light loss of property on the Hanford Site and minor injuries to Hanford staff observed.

The Board determined that the Hanford Site successfully activated its emergency response organization to combat the 24 Command Wildland Fire. No substantial gaps in management systems or infrastructure were identified. Consequently, the judgments of need reached by the Board represent areas for improvement and lessons learned.

Judgments of Need

Judgments of need represent managerial controls and safety measures necessary to prevent or minimize the probability or severity of a recurrence of an event. They flow from the conclusions and causal factors and require that management develop follow-up corrective actions. The specific needs identified by the Board have been targeted to provide for the most efficient and effective focus of management's energy. The Board developed four primary judgments of need based on conclusions reached through analysis of the pertinent facts and occurrences during the event. The primary judgments of need are as follows:

- RL/ORP should evaluate existing emergency response processes related to Hanford events affecting state and national systems, as well as state and national events affecting Hanford systems. (JON-1)
- RL/ORP should review and revise sitewide and protracted emergency and recovery operations, including emergency communications and resource readiness. (JON-2)
- DOE-HQ Office of Emergency Response (SO-42) should assess the Federal Radiological Emergency Response Plan (FRERP) for inclusion of EPA independent radioactivity monitoring during events and for limited deployment of the Federal Radiological Monitoring and Assessment Center (FRMAC) whenever EPA has been deployed. In addition, DOE-HQ Office of Emergency Response (SO-42) should determine if AMS assets are at an acceptable level of readiness. (JON-3)
- RL/ORP should improve the corrective action management system to ensure that improvement actions are managed adequately. (JON-4)

Judgment of Need 1

RL/ORP should evaluate existing emergency response processes related to Hanford events affecting state and national systems, as well as state and national events affecting Hanford systems. (JON-1)

RL should implement or revise agreements with external agencies and non-DOE tenants of the Site that define roles and responsibilities for emergency response. (1a)

RL/ORP and the contractors need to engage and coordinate with local clean air authorities, state regulators, the DOE-HQ Office of Environment, and the Washington State Department of Transportation to improve firebreaks along state right-of-way shoulders between Highways 24 and 240 and the DOE fenceline. (1a1)

RL/ORP need to update and enhance MOUs and agreements between RL/ORP and the FWS, and between the HFD and FWS, to address NWCG roles and responsibilities and protocols associated with ordering aerial tanker suppression support. (1a2)

RL/ORP need to put into place MOUs or agreements with the Yakima Training Center (for aerial helicopter support for wildland fire suppression) and the Washington State Patrol Yakima Detachment (for incident management) to support wildland firefighting operations. (1a3)

RL/ORP should review and revise as appropriate agreements (e.g., MOUs, contracts) with non-DOR tenants at the Hanford Site (e.g., LIGO, U.S. Ecology, Energy Northwest) that implement execution of Site emergency management. (1a4)

RL/ORP should evaluate establishment of formal MOUs with WDOH and EPA on protocols for radiological monitoring during the emergency, ingestion, and recovery phases of a radiological event. (until resolution of this issue is provided at the national level; see Recommendations for Resolution of JON-3). (1a5)

RL/ORP should review and revise existing processes for control and deployment of non-Hanford emergency personnel used during field emergency response. (1b)

The HFD needs assessment document must be updated to include NWCG planning, protocols, involvement, and resources necessary to manage future wildland fires of similar size, and results should be fed back into the Emergency Preparedness program. (1c)

RL/ORP should evaluate the need for additional liaison and interfaces between the EOC and external agencies to ensure accurate and timely exchange of emergency status and information. (1d)

RL/ORP should consider inclusion of mutual aid representatives at the EOC during sitewide emergency events. (1d1)

RL/ORP should review and revise the process for technical review for accuracy and approval of hazard communications with outside agencies. (1e)

Judgment of Need 2

RL/ORP should review and revise sitewide and protracted emergency and recovery operations including emergency communications and resource readiness. (JON-2)

RL/ORP should examine the emergency management process to ensure that facility/site abandonment is addressed in the evacuation process. (2a)

RL/ORP should review and revise existing emergency response procedures to address non-facility-specific and multiple-facility emergencies, including Incident Command Post structure and staffing. (2b)

RL/ORP should add a new Emergency Action Level based on an anticipated fire in the Snively Canyon area of the Arid Lands Ecology Reserve. (2b1)

RL/ORP should review and revise the requirements for identification of essential personnel during emergencies and for the provision of avenues of safe access. (2c)

RL/ORP should review, revise, and demonstrate effectiveness of emergency response communication capabilities to enable participation of pertinent Site and external entities in emergencies that affect the Hanford Site (cell phones, radio frequencies, information dissemination). (2d)

RL/ORP should review, revise, and demonstrate effectiveness of emergency response staffing levels to ensure shift turnovers can be supported for protracted operations. (2e)

RL/ORP should review and revise the process for identification of Site staff expertise in advisory and support capacities to enhance emergency management teams. (2f)

RL/ORP should review and revise the process for collection and analysis of radiological data during and post-event. (2g)

DOE/ORP should review and revise the recovery action process from emergency events to include scope beyond facility reentry. (2h)

RL should review and revise the need to disseminate requirements for use of non-DOE equipment. (2i)

RL/ORP should review and revise the process for the technical review for accuracy and approval of press releases. (2j)

RL/ORP should upgrade the tools available to emergency response to enhance the collection, display, and dissemination of emergency data. (2k)

RL/ORP should review and revise the process for controlling airspace and authorizing DOE-funded personnel on chartered aircraft. (2l)

RL and the General Services Administration should assess the design of the Federal Building to support Emergency Operations Center operations. (2m)

RL/ORP should review and revise the staging, maintenance, and storage of equipment used in emergency response. (2n)

Judgment of Need 3

DOE-HQ Office of Emergency Response (SO-42) should assess the FRERP for inclusion of EPA independent radioactivity monitoring during events and for limited deployment of FRMAC whenever EPA has been deployed. In addition, DOE-HQ Office of Emergency Response (SO-42) should determine if AMS assets are at an acceptable level of readiness. (JON-3)

Judgment of Need 4

RL/ORP should improve the corrective action management system to ensure that improvement actions are managed adequately. (JON-4)